

REMARKS

Claims **1-36** are pending in the application.

Claims **1-35** stand rejected.

Claim **36** has been added.

Claims **1, 14-18, 22, 24, 27, 30, and 33** have been amended.

As a preliminary matter, the Examiner should be informed that the Office Action included a copy of an initialed PTO form 1449 that does not appear to apply to the instant application.

Claim Objections

The Examiner has objected to claims **1, 4, 27, 30 and 33** because of informalities. Claims **1, 27, 30 and 33** have been amended to address these informalities by, among other changes, replacing the phrase “in a first unit of storage” with the phrase “into a first unit of storage.” Thus, Applicants respectfully request that the objections to claims **1, 27, 30 and 33** be withdrawn.

Regarding the additional objection to claim **4** as being unclear, Applicants respectfully submit that the claim **4** terms of “said second unit of storage,” “said unit of storage,” and “said storage unit” each refer to different aspects of the invention. In particular, “said unit of storage” refers to a unit of storage of a storage unit (a first recited in claim **4**), while “said storage unit” refers to the storage unit which includes that unit of storage. The different terms are used to clearly define the claimed invention. Thus, Applicants respectfully request that the Examiner withdraw the objection to claim **4**.

Rejection of Claims under 35 U.S.C. § 112

Claims **4 and 6** stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action states that there is insufficient antecedent basis for the limitation of “said unit of storage” in claims 4 and 6.

Applicants respectfully disagree because the claimed “said unit of storage” of dependent claim 4 finds antecedent basis in the claimed “unit of storage,” also of dependent claim 4. The claimed “unit of storage” is distinct from the claimed “first unit of storage” or the claimed “second unit of storage” of previous claims, and Applicants felt it unnecessary to add a cumulative qualifier such as “third” to further distinguish “said unit of storage” from the claimed first unit of storage, second unit of storage, or storage unit. Applicants respectfully submit that the claimed qualifiers should sufficiently distinguish the unit of storage from either of the first or the second unit of storage, or from said storage unit. However, if the Examiner wishes to maintain the 112 rejection, Applicants, in order to expedite prosecution, are willing to consider amending these claims to further clarify the claimed antecedent basis of dependent claims 4 and 6.

Rejection of Claims under 35 U.S.C. § 102

Claims **1 and 3-35** stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kashima et al, U.S. Patent No. 5,485,598 (“Kashima”). As the claims have been amended for purposes of clarification and not to narrow the scope of the claims, Applicants respectfully traverse this rejection for the following reasons. Further, while not conceding that the cited

reference qualifies as prior art, but instead to expedite prosecution, Applicants reserve the right, for example, in a continuing application, to establish that the cited reference, or other references cited now or hereafter, do not qualify as prior art as to an invention embodiment previously, currently, or subsequently claimed.

As generally recited in Applicants amended independent claims 27, 30, 33, and 36, Applicants' independent claim 14, as amended, recites the following:

A storage system comprising:  
an old data cache, wherein said old data cache is configured to be  
maintained by one of an upper-level system and a lower-level  
system, and accessed by the other of said upper-level system and  
said lower-level system.

In the Office Action, the old data cache 17 of figure 8 in Kashima is cited in an attempt to show the "old data cache" of Applicants' independent claim 14. However, old data cache 17 of Kashima does not provide features in any way comparable to the claimed limitations of Applicants' independent claim 14. Specifically, old data cache 17 of Kashima is not configured to be maintained by one of an upper-level system and a lower-level system, and accessed by the other of the upper-level system and the lower-level system. Applicants' old data cache is defined in the specification to provide these features and independent claim 14 has been amended herein to expressly include the limitations. Conveniently, having one system maintain the old data cache and allowing the other system to access the old data cache, the need to read old data from another source is eliminated. Thus, Kashima does not anticipate Applicants' independent claim 14.

Regarding newly added independent claim 36, limitations of previously independent claim 1 have been separated from amended claim 1 and drafted into independent claim 36 to clarify the limitations of previously independent claim 1 and further distinguish the limitations from Kashima. As generally required by amended independent claims 14, 27, 30, and 33, newly added independent claim 36 recites the following:

A method comprising:  
maintaining a first cache and a second cache, wherein said maintaining is performed by one of an upper-level system and a lower-level system;  
cloning information stored in a first unit of storage into a second unit of storage prior to modifying said information stored in said first unit of storage, wherein said first cache comprises said first unit of storage and said second cache comprises said second unit of storage; and  
providing access to said second cache by the other of said upper-level system and said lower-level system.

Applicants respectfully submit that, when drafting the instant application, language for the claimed “cloning information” was specifically selected by Applicants for the purpose of distinguishing the claimed method from merely copying information. The formative “cloning” refers to more than simply copying information from one place to another, although it may comprise copying information as required by Applicants’ dependent claim 3. For example, in one embodiment, cloning information includes writing “parity information” for a cloned page to parity cache 250 (see application, paragraph 0069). Advantageously, in another embodiment, the claimed cloning may also include a filesystem making a cloned page available for access by a volume manager by placing the cloned page in an old data cache (application, paragraphs 0070 and 0071). Thus, Applicants urge the Examiner to recognize the distinction between Applicants’ claimed cloning operations and the common copying operations of Kahima.

Applicants' new claim 36 has been drafted to further delineate Applicants' invention from Kashima, and Applicants respectfully submit that Kashima fails to anticipate these limitations. Kashima fails to provide features comparable to the claimed cloning, which is performed prior to information in the first unit of storage being modified, a first unit of storage being maintained by one of an upper-level system and a lower-level system, and second unit of storage being accessed by the other of said upper-level system and said lower-level system.

Specifically, Kashima fails to show the cloning of the first cache into the second cache prior to modifying information in the first cache. Although Kashima shows copying "data blocks on the disk cache 13 into the old data cache 17 of the main memory 12" and copying "data blocks of the user buffer 14 of the main memory 12 into the disk cache 13 to store as new data blocks therein" (Kashima, col. 5, lines 21-26), the copying of Kashima is obviously different than Applicants' claimed cloning and fails to anticipate Applicants' claimed cloning because neither of Kashima's first and second caches that are maintained by the upper-level system are accessed by a lower-level system. The data held in the old data cache 17 of Kashima is sent to the disk array device 1 (the lower level system). The disk array device 1 does not perform an access into (or cause such access to) the old data cache 17 of Kashima (see Kashima, col. 5, lines 34-37). In other words, Kashima clearly fails to teach, suggest, or otherwise disclose accessing a second cache by one of the upper or lower level systems and maintaining of both the second and first caches by the other system.

In view of the above described distinctions as well as others, Applicants respectfully request the Examiner to withdraw the 35 U.S.C. § 102(e) rejection of independent claims 14, 27, 30, and 33 as being anticipated by Kashima, and to recognize that newly added independent claim 36 is not anticipated by Kashima. As dependent claims 3-13, 15-26, 28-29, 31-32, and 34-

35 add limitations to otherwise allowable base claims, Applicants urge the Examiner to withdraw the 35 U.S.C. § 102(e) rejection to these claims.

Rejection of Claims under 35 U.S.C. § 103

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kashima.

Applicants respectfully traverse this rejection.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); MPEP 2142. The Applicants respectfully submit that the Examiner has failed to establish a prima facie case of obviousness.

Claim 2 depends from claim 1 which has been amended to depend from newly added independent claim 36. As discussed with respect to the above 102 rejection, the limitations of independent claim 36 are not found in Kashima, much less the further limitations added by dependent claim 1 and further added by the rejected dependent claim 2. In formulating the 103 rejection of the October 14, 2005 Office Action, the Examiner has failed to address modifying Kashima in an attempt to support the cloning required by independent claim 36. Thus, no appropriate suggestion or motivation has been offered to modify Kashima as required to support

a prima facie case of obviousness. Further, any modification to Kashima to show the cloning would not be based on Kashima's teachings or suggestion, but on Applicants' disclosure, which is improper hindsight.

Also not shown by Kashima is the feature of claim 36 requiring the maintaining of a first cache and a second cache by one of an upper-level system and a lower-level system, and providing access to the second cache by the other of the upper-level system and the lower-level system, i.e., the first and second caches being accessible by both of the upper and lower level systems. Kashima does not teach the features of claim 36 much less the single cache feature of dependent claim 2, and the features would not be obvious because the caching arrangement is irrelevant as to whether the upper-level system and the lower-level system access cloned information in a second cache or a single cache holding the cloned information.

Further, Kashima does not teach or suggest the limitations of dependent claim 2 because there is no advantage for Kashima to modify their invention in the manner of the claimed invention. For example, as shown in the below cited portion of Kashima, whenever Kashima holds a copy of cached data, Kashima still needs to send the data (e.g., the new data 6, the old data 7, the old ck data 8) to the disk array 1 to generate new CK data 9 by performing an exclusive OR (XOR) at the XOR arithmetic unit 3.

*... the OS moves to step S11 and transfers the new data block on the disk cache 13 and the old data blocks on the old data cache 17 to the disk array device 1 in step S11. Next, in step S12, the disk array device 1 executes an exclusive OR calculation in the exclusive OR arithmetic unit 3 by using the block of the transferred new data 6, the blocks of the old data 7 and the blocks of the old CK data 8 on the old CK data cache 16 to produce a block of the new CK data 9.*

Kashima, col. 5, lines 34-42 (emphasis added)

Thus, having the old and new data in the same cache provides no benefit to Kashima since Kashima would still need to send the old and new data to disk array 1. In the claimed invention, however, by keeping both old and new data in a single cache, the cloning operation is made easier and more efficient. Kashima is oblivious to this advantage, as would be expected, given that Kashima fails to teach the claimed invention. Since Kashima would simply be sending this data out of the cache, whether one or two caches were used, Kashima's system would enjoy no advantage to using a single cache.

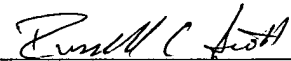
Thus, Applicants respectfully submit that dependent claim 2 is patentable in view of Kashima. For at least the above reasons, Applicants urge the Examiner to withdraw the 35 U.S.C. § 103(a) rejection of dependent claim 2.



CONCLUSION

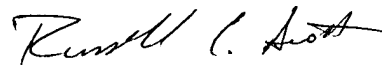
In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is invited to telephone the undersigned at 512-439-5089.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 13, 2006.

  
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Date of Signature

Respectfully submitted,



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